VULCAN™ IGS

User's Manual

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v1.3

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VULCAN™

IIGS

User's Manual

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INTRODUCTION

About the Vulcan

The Software

The Vulcan comes preformatted and set into ProDOS partitions.

Computer	Size	#of Preset Partitions	Contents
IIGS (and retrofit)	20 Meg	1	GS/OS, Utils
IIGS (and retrofit)	40 Meg	2	1) GS/OS, Utils 2) Empty
IIGS (and retrofit)	100 Meg	4	1) GS/OS, Utils 2) Empty 3) Empty 4) Empty

GS/OS (GS and Retrofit Only)

We've included GS/OS 5.02 on the first partition of the IIGS and retrofit Vulcans. You must have at least 768K of system memory to run GS/OS. The hard drive contains the complete system while the 3.5" disk has a stripped-down, boot version. You may want to make a copy of the complete 5.02 version onto your own 3.5" disks as backup. Use the Finder to copy the contents of the System.Disk folder and the System.Tools folder to 3.5" disks. (Open the System.Disk folder, Select All and drag it to a formatted disk. Do the same with the System.Tools folder.)

When you boot the Vulcan, you'll be in the Finder. ***Refer to "Apple IIGS System Disk User's Guide" before calling Technical Support with questions about the Finder.*** The User's Guide, included with your IIGS, will tell you what you need to know about using the Finder to copy, erase, and format disks, launch programs and more. If you do not have a copy of the User's Guide, see your Apple dealer.

GS/OS Native Mode Driver (GS and Retrofit Only)

Included in the System Drivers folder is Vulcan's native mode driver which speeds up Vulcan's access time dramatically. The driver is described in Chapter 2.

Backup II

Backup II is Apple's ProDOS backup utility for backing up the ProDOS partitions. For instructions on using Backup II, refer to the Chapter 5.

The Partition Manager

Because ProDOS allows a maximum of 32 Meg per drive device, the 20 Meg Vulcans are shipped with one formatted ProDOS partition, the 40 Meg Vulcans are shipped with two formatted ProDOS partitions and the 100 Meg Vulcans are shipped with four formatted ProDOS partitions.

The Partition Manager program (PART.MANAGER) allows you to configure the Vulcan in up to 16 different segments. However, you don't need to set up a separate partition for each program. Set up your own partitions if you want to run operating systems other than ProDOS or if you want to resize and add to the existing ProDOS partitions. Any partition can be set up to run under ProDOS, DOS 3.3, Pascal, or CP/M. The Partition Manager allows you to resize partitions, format partitions, activate partitions and select which partition to boot.

The ProDOS 8 version provided on the Vulcan and the floppy disks has been patched to allow ProDOS 8 to use four ProDOS partitions from the Vulcan instead of only two (the ProDOS restriction).

Park Heads

The Park Heads program moves the hard drive's read/write heads to a "safe" position on the disk. This prevents the heads from bouncing on a piece of the disk and destroying the data there. You need to run Park Heads only when you plan to move the Vulcan or your computer. Run it just before turning off your computer.

It is included in the Vulcan CDA (see Appendix B) and is also a stand-alone program on the Vulcan.

- *Note:* 100 Meg drives have an auto-park feature which moves the heads to the "safe" position each time you shut down.

The Separate Disks

The 3.5" disk included with the Vulcan IIGS and retrofit is a backup of the files necessary to boot GS/OS. It also contains the Vulcan's utilities such as the native mode driver, Partition Manager, Park Heads, Backup II, and a modified ProDOS 8.

The 5.25" disk is two sided. The front side contains Vulcan's ProDOS 8 utilities including Backup II, Partition Manager, Park Heads, and ProDOS patcher. The back side has the DOS 3.3 system and various DOS 3.3 utilities including Æ's version of FID, which support the Vulcan. (Refer to the DOS 3.3 section of Chapter 4.)

The Vulcan's Fan

The Vulcan's fan keeps the power supply and hard drive cool. If you have several powerful cards in your computer however, consider a separate cooling fan for your system.

The Power Supply

The Vulcan's built-in power supply replaces your computer's power supply. Applied Engineering designed Vulcan's power supply to be both more compact and more powerful than the one included with your computer.

Features

- ❑ power supplyFCC Certified
- ❑ Light-weight aluminum case
- ❑ Externally accessible fuse with spare.
- ❑ 110/220 VAC, 50/60 Hz
- ❑ Built-in Fan
- ❑ Cool Running
  - 40°C w/fan
  - 60°C w/o fan under full load
- ❑ Power components to case
- ❑ 70 full watts w/o fan
- ❑ Adjustable 5 Volts DC

Running Programs from Vulcan

You don't need to create a separate partition for each program you want to run. The number of programs each partition can hold is limited only by the space you have allotted to the partition. Copy the programs to the Vulcan partition just as you would copy from one floppy disk to another.

If you have been using the Finder or other program launcher to run your programs, you can continue to use it to run programs from the Vulcan. (Refer to the manual, "Apple IIGS System Disk User's Guide," that was included with your GS for Finder instructions.)

Although you don't need separate partitions for each program, if you're using GS/OS version 5.02, some programs are not compatible and will not run properly. If you're having trouble running a non-copy protected program from GS/OS, set up a separate partition with the software's operating system installed and boot from that partition to run the software.

Copy Protected Programs

Copy protected programs are an exception; some programs are written to run only from floppy disk and cannot be run from a hard disk.

CHAPTER ONE

IIGS Installation

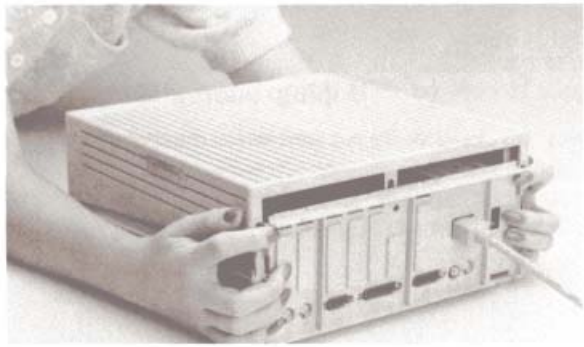
Installation Procedure

You'll need no special tools to install the Vulcan. Simply follow the instructions below.

- ❖ *Note:* Retrofit owners, the installation is basically the same when installing into a //e case. Follow the same instructions.

1) Turn Off and Open Computer

Turn off the computer and then press in the two latches at the rear of the case with your forefingers while using your thumbs to push the lid up and towards you. (See picture following.)



Remove the IIGS cover

2) Remove Power Supply

i) Remove slot one card.

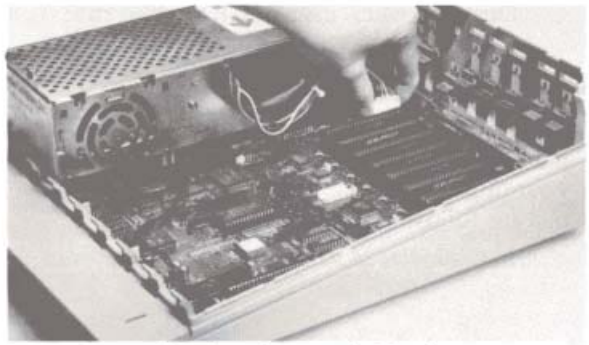
If you have a card installed into slot 1, you'll need to remove it to give yourself room to reach the internal power plug. Refer to your slot 1 card's manual for proper removal.

ii) Unplug external cord from back of computer.

This is the cord that runs from the back of the computer to the wall socket. Unplug it from the back of the computer and from the wall socket as well.

iii) Unplug internal cord from motherboard.

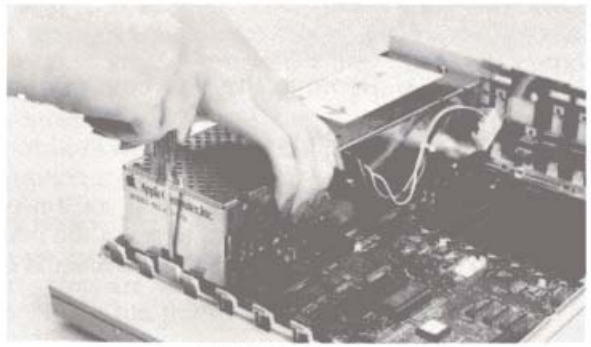
The internal power cord is the multi-wire cord running from the power supply toward the back of the motherboard. Pull up firmly on the white plastic part of the plug.



Unplug Internal Cord

iva) (GS cases) Gently pull back on tab at bottom front of power supply.

A small flatblade screwdriver may keep you from breaking a nail.



Pull Back Tab

ivb) (//e cases) Remove screws.

Turn the computer on its left side. On the bottom of the computer you will find four screws in a rectangular pattern the size of the power supply. While firmly holding onto the power supply, remove the four screws.

v) Lift out power supply.

You may want to store the power supply in the Vulcan's box.

3) Remove Vulcan from Packing.

4) Check Voltage Setting

The switch setting on back of the Vulcan must be set to the proper voltage (115 in the United States).

5) Insert Vulcan

ia) (IIGS cases) Insert back end first.

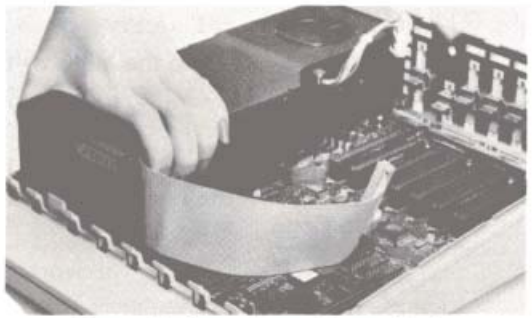
Align the three holes in the back of the Vulcan with the three prongs in the back of the computer.

ib) (//e cases) Insert from end first

With the computer still on its side, turn the Vulcan at an angle and insert it into the opening left by the old supply.

iia) (IIGS cases) Snap down into front tab.

Push down on the front of the Vulcan until the plastic tab on the computer case snaps into the hole at the bottom front of the Vulcan. You should hear the tab snap into place.



Snap Vulcan Into Front Tab

iib) (//e cases) *Use four screws provided* to secure Vulcan

Align the holes on the bottom of the Vulcan and the computer case. Do not use the screws from the old power supply. Do not over-tighten the screw.

6) Plug Internal Power Cord Into Motherboard.

The Vulcan's internal power cord plugs into the motherboard in the same place as the old power supply's cord. The connector's tab should be toward the right side of the computer.

❖ *Note:* Do not force the connector; it will plug in easily in one direction.

Plug Internal Cord Into Motherboard

7) Set Switches According to Slot

The Controller Card will work from any slot. However, there are a few conditions of which you need to be aware.

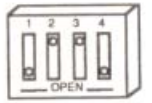
Do ***not*** install the card into the Memory Expansion slot. We recommend installing the card into slot 6 or 7.

❖ *Pascal Note:* If you will be using Apple Pascal v1.3, you must install the controller into slot 4, 5, or 6. Pseudo-slotting must not be enabled.

Check the switches on the card. The switch block is the red rectangular box toward the bottom right of the card. The switches should be set as shown below. You'll probably need to remove the tape covering the switches first. (For a complete description of the functions of the switches, refer to App. C.)

Use a small, pointed object, like a wooden toothpick or bent-out paperclip to change a switch setting. The circle on each switch represents the end that should be pressed for a standard IIGS setup.

Switch	Setting
1	OPEN
2	CLOSED
3	CLOSED
4	OPEN



Default Switch Setting

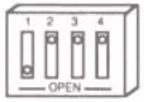
Slot 7 Exception (Pseudo-Slotting)

If your slot 7 does not have a card in it, but is blocked, you can install the card into another slot and make it appear to be in slot 7. This is most valuable if you have slot 3, 4, or 5 unoccupied. You can leave the slot containing the card set to that slot's function. This leaves slot 3 free for its 80 column function, slot 4 free for mouse control, or slot 5 free for Smart Port (disk drive control). This process is called pseudo-slotting.

If you want to pseudo-slot the card, you'll need to make a simple adjustment to the card first.

1) Locate the switch block on the controller card.
2) If a piece of tape is covering the switches, remove it.
3) Set the switches in the position shown following.

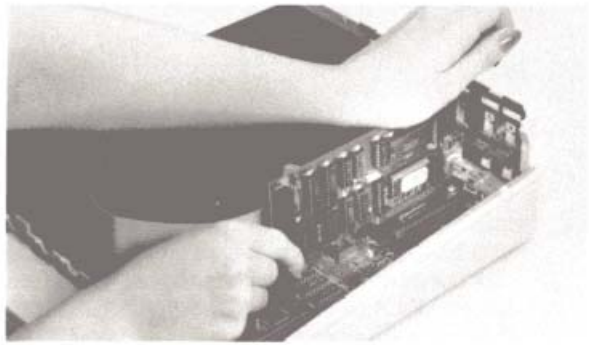
Switch	Setting
1	OPEN
2	CLOSED
3	CLOSED
4	CLOSED



Switches Set for Pseudo-Slotting

8) Insert Card Into Slot

Align the gold "fingers" of the controller card's edge connector with the slot and then use the heel of one hand to push the card down into the slot and seat it firmly.



Insert Controller Card into Slot

9) Connect Cable from power Drive to Controller Card

Attach the wide flat cable from the hard drive to the connector on the controller card. The connector and socket are keyed so that they will attach in only one way.

Make sure that the cable connector is firmly seated in the controller card socket.

10) Reinstall Any Cards Removed

Replace any cards you have removed for the installation following those cards' installation instructions.

❖ *WARNING!* IF YOU HAVE A CARD IN SLOT 1, use the insulator card (2" x 6") included with the Vulcan package. Applied Engineering will not be responsible for damage to any other products so be careful when reinstalling your cards.

11) Close Computer

Replace the lid by sliding the front of the lid in first, lowering the back edge into place and then pushing gently and firmly on the back corners of the lid until it pops into place.

12) Plug In External Power Cord

This is the same cord as your original power supply used. Connect it to the back of the Vulcan and then plug it into the wall socket.

Hardware installation is complete. *Congratulations!*

What Now?

Using GS/OS

You may want to use only the GS/OS operating system included with the Vulcan. If that's the case, read the next chapter to configure your hard disk for booting.

Dividing the Partitions

❖ *Note:* You don't need to create a separate partition for each program you want to run.

If you'd like to set up the hard drive so that it appears to be several separate hard disks, refer to Chapter 3 now. Most users can use the drive as shipped and won't need to set up separate partitions.

Loading Different Operating Systems

If you'd like to use your Vulcan under Pascal, CP/M or DOS 3.3 you'll need to read Chapters 3 and 4.

CHAPTER TWO

Using GS/OS and ProDOS 8

Maximum Files in the Root Directory

Both ProDOS 8 and ProDOS 16 limit the maximum files in the root directory to 51. You may, however, put a virtually unlimited number of files into subdirectories/folders.

Booting from Vulcan

Most likely, you will want to boot GS/OS from the Vulcan; it's much faster than booting from floppy and you don't have to put in and take out disks.

Setting The Vulcan to Boot

1) Boot Computer and Set Slots

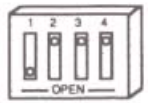
You must set the slot containing the controller card to "Your Card" under Slots option of the Control Panel. Refer to your IIGS owner's manual for more information on setting the slot.

Slot 7 Exception (Pseudo-Slotting)

If you want the card to appear to be in slot 7 even though it's installed into another slot (as mentioned earlier) you'll need to set your slots as follows:

1) Leave the slot in which the controller card is installed set to that slot's function (i.e. ***not*** "Your Card")
2) Set slot 7 to "Your Card."

❖ *Note:* Make sure that you've set the switches on the card to the proper position.



Switches Set for Pseudo-Slotting

2) Set to Boot from the Vulcan

Set the **Startup Slot** under the Slots option to the slot that your Vulcan is in. (If you're pseudo-slotting, set Startup Slot to 7.) The Vulcan is preformatted and ready to boot into GS/OS.

If you want to boot from a different partition, you'll use the Vulcan CDA to change boot partitions.

Copying a Different GS/OS System to the Vulcan

If you want to copy a GS/OS operating system other than release 5.02 onto the Vulcan using the Finder, follow these steps:

1) Open the disk's icon
2) Select ProDOS and the System folder if you don't need the rest of the files on the disk or use the Select All option to copy all the files.
3) Drag the files you've selected from the boot disk to the Vulcan.

❖ *Note:* Simply dragging the disk icon containing the System folder to the Vulcan will get you an "Unable to load ProDOS" error message.

If you have already dragged the icon of the System disk to the Vulcan icon (using the Finder), all the boot files will be in a folder of their own on the Vulcan. You'll need to open this folder, use the Select All option, and drag the folder's contents to the Vulcan. You can throw away the now empty System disk folder.

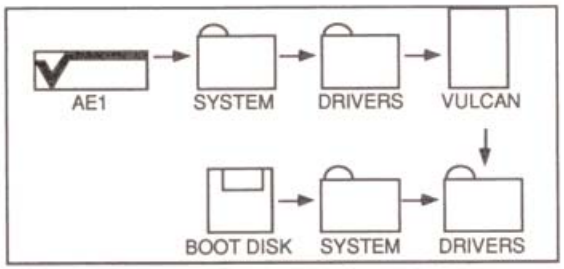
If you copy a version of GS/OS different from the one we supply on the Vulcan, you'll need to copy the Vulcan driver for GS/OS to the new system's Drivers file. (See the next section for directions.) Also copy both P8 and Start.GS.OS from the 3.5" or 5.25" disk's System folder to allow ProDOS 8 to recognize more than 2 partitions.

Vulcan Speed Under GS/OS

We've written a special driver to speed up the Vulcan's access time under GS/OS. If you're booting GS/OS from the Vulcan, this driver is automatically installed. However, if you're booting from a RAM disk, ROM disk, 3.5" drive, or a GS/OS other than the one provided with Vulcan, you'll need to copy the driver to the boot disk.

To copy the Vulcan Driver using the Finder follow these steps:

1) Open the Vulcan's System folder (or the System folder of the Vulcan's 3.5" disk).
2) Open the Vulcan's Drivers folder (located within the System folder).
3) Open the System folder of the disk from which you want to boot.
4) Locate the Drivers folder within the System folder.
5) Drag the file VULCAN from the Vulcan's Drivers folder to the boot disk's Drivers folder.



Where to Put the Vulcan Driver

You can also use your favorite copy program to copy the driver.

Source: /AE1/SYSTEM/DRIVERS/VULCAN

Destination: /YOUR.BOOT.DISK/SYSTEM/DRIVERS

where /AE1 is the name of your Vulcan GS/OS partition and /YOUR.BOOT.DISK is the name of the disk to which you're copying.

Now when you boot from the disk, the Vulcan driver will be installed and your access speed will be dramatically improved.

ProDOS 8

The ProDOS 8, P8 and Start.GS.OS files we've included on the Vulcan and the 3.5" disk are modified to allow ProDOS 8 to recognize more than two Vulcan partitions. If you're booting from other ProDOS 8 disks, copy the ProDOS 8 file to the boot disk(s) and not the P8 and Start.GS/OS files. If you're booting from other GS/OS disks, copy the P8 and Start.GS.OS files and not the ProDOS 8 file to the boot disk(s).

The first two ProDOS partitions which are turned on will be drives 1 and 2 of the Vulcan's slot. If you have more than 2 turned on, the other(s) will show up as drives in another slot (probably 1). This doesn't interfere with any other device you have in that slot.

CHAPTER THREE

The Partition Manager

This chapter is an in-depth look at the Partition Manager. You may want to read over the section headings in this chapter and then go on to Chapter 4 for insturctions on how to quickly set up a partition for DOS, Pascal, or CP/AM.

First...

The first thing you should know about the Partition Manager (PM) is that it is a *formatting utility.* Modifications to the size of a partition and switching operating system change the basic structure of the disk and will destroy any data currently within the partitions you are resizing. So, before using the Partition Manager, save any data that you want to keep and restore it after re-partitioning.

The Vulcan Classic Desk Accessory for the IIGS

The Vulcan Classic Desk Accessory lets you change Vulcan boot partitions and Write Protect partitions without running the Partition Manager. If you want to change only the boot partition or turn on and off the write protection of a partition, use the Desk Accessory. (refer to App. B.

About the Partition Manager

The Partition Manager is a ProDOS program that lets you segment the hard disk. You can use these segments, or partitions, as if they were large floppy disks or individual hard disks. Each can have its own name, hold its own files, even run under any one of four different operating systems.

- *Reminder:* You don't need to create a separate partition for each program you want to run.

The Partition Manager allows a maximum of 16 separate sections. ProDOS and CP/M operating systems can both have up to four partitions turned on at the same time. DOS 3.3 and Pascal allow for only 2 sections active at the same time. You could set up all 16 partitions as ProDOS, for example, but only four of these can be accessed (turned on) at one time.

- *PC Transporter users:* You can also use the hard disk as an MS-DOS storage device by creating an MS-DOS hard volume on a ProDOS partition. Follow the directions in the PC Transporter manual for using a hard disk.

Backing Up the Partitions

Make ProDOS backups with Backup II, included on the Vulcan drive. Make DOS 3.3 backups with FID, included on Vulcan's DOS 3.3 disk. Backup Pascal and CP/M with the programs you currently use for copying files under these systems.

Running the Partition Manager

From the Finder

1) Boot from the Vulcan hard disk or from the Vulcan 3.5" disk.
2) Double-click the AE1 or the Vulcan disk icon to open its window.
3) Double-click the icon `PART.MANAGER` to run the application.

From Disk

Boot the 5.25" ProDOS Utilities disk and choose Partition Manager from the menu.

From Basic

From BASIC, set your current prefix to the VULCAN disk and enter -PART.MANAGER at the BASIC prompt.

Other Launchers

Follow the instructions for the launcher you use to run the application `PART.MANAGER`.

Once the program is run, you'll see the current partition settings. A sample screen is shown below:

```
AE VULCAN PARTITION MANAGER    (V x.x)

  MODIFY     FORMAT     PRINT     QUIT



Lock  name       size  on system  boot
1    AE.1      32767.5K * PRODOS    *
2    AE.2       9460.0K * PRODOS
3                  .0K    CLEAR
4                  .0K    CLEAR
5                  .0K    CLEAR
6                  .0K    CLEAR
7                  .0K    CLEAR
...
```

The PM Menu

The MODIFY Mode

While in modify mode you can enter the Partition Manager options table to configure your hard drive into different partitions.

Entering MODIFY Mode

Use the left and right arrow keys (or J and K keys) to select MODIFY from the top menu bar and then press <return>.

While in MODIFY mode, the Partition Manager is set up like a spread sheet. Use the arrow keys to move from cell to cell.

To move the cursor	Use
up	"I" or up arrow
down	"M" or down arrow
left	"J" or left arrow
right	"K" or right arrow

Locking/Unlocking Partitions

Locking a partition protects that partition from being written to, reformatted, erased or resized. A locked partition functions the same as a write protected disk.

- ❖ *Note:* You can also lock and unlock (write protect) the partitions from the Vulcan CDA. Refer to Appendix B.

To lock or unlock a drive, while in MODIFY mode:

1) Move the cursor to the LOCK column of the partition you want to lock or unlock. Locked partitions are marked with an asterisk (*).
2) Press the <return> key to toggle between locked and unlocked.

Partition Names

Each partition can have its own name. The name you assign a partition is an easy way for you to keep track of the partitions when setting the boot drive and active partitions.

The operating systems will not actually use these names except as defaults when formatting. So, you could name a ProDOS partition "LAURA" under the Partition Manager, format the partition using the default, LAURA, and then, in the Finder you can rename it STUFF.O.LAURA.

Name Rules

Partition names basically follow the rules of ProDOS names.

These rules are:

1) Name can include letters, numbers, or periods but not spaces.
2) Name must begin with a letter.

3) Name can be up to 10 characters long.

- ❖ *Note:* ProDOS actually allows names to be 15 characters long, however, the PM allows only 10.

Name the Partition

To name a partition, while in MODIFY mode:

1) Move the cursor to the NAME column of the partition you want to name.
2) Press <return>.
3) Type in the name for the partition. (Refer to Name Rules above for acceptable names.)
4) Press <return>

Canceling Rename

To cancel a rename, while in the ENTER NAME mode, press <esc>. The name will be left as it was.

Setting the Partition Size

When we shipped your Vulcan, we allotted the maximum allowable space to the first partition with a ProDOS system installed. ProDOS allows a maximum of 32 Megabytes per drive. Any available disk space above the maximum is shifted to the next partition(s).

If you decide to resize the partitions remember this important guideline:

BACK UP!

When you enlarge a partition, you're taking space away from another partition. The space you take away may be the portion that contains important files or applications. Backup copies of the partitions let you correct any slips you might make.

The partition you have selected will give space to or take space from the next partition(s) down.

Sizing Rules

When sizing, keep in mind the following rules:

1) You must have the operating system of both the partition you are resizing as well as the partition next in line set to CLEAR.
2) Any sequential files that are also set to CLEAR may also be modified.
3) ProDOS allows a maximum partition size of 32 Meg.
4) DOS 3.3 allows a maximum partition size of 32 Meg made up of several volumes which must be either 140K or 400K.
5) In DOS 3.3, the number of 140K and 400K volumes contained in a single partition are set from the fromat option.
6) In DOS 3.3, you'll need at least one 140K volume to make the partition bootable.
7) Pascal allows a maximum partition size of 16 Meg (16,383.5K -- $7FFF).
8) CP/M allows a maximum partition size of 8 Meg (8192.0K -- $4000).

Sizing the Partition

❖ *IMPORTANT:* If you currently have files within the partitions you are resizing, you could lose these files. Back up the partitions that will be involved in resizing before making any changes.

When resizing a partition, you'll need to:

1) Unlock the partitions that will be involved in resizing. Refer to "Locking/Unlocking Partitions" above.
2) Set the partition to CLEAR.

   This allows you to take space away from one partition and distribute it to others.

   To set the SYSTEM to CLEAR, while in MODIFY mode:

   i) Move the cursor to the SYSTEM column of the partition you want to resize.
   ii) Press <return>.
   iii) Use the arrow keys to toggle through the system options until you reach CLEAR.
   iv) Press <return>

3) Set the partition size.

   To select the size for a partition:

   i) Move the cursor to the SIZE column of the partition you want to change.
   ii) Press <return>.
   iii) Select the size for the partition using the same keys that move the cursor.

To	Use
increase size by 32K	"I" or up arrow
decrease size by 32K	"M" or down arrow
increase size by 0.5K	"K" or right arrow
decrease size by 0.5K	"J" or left arrow

   iv) Press <return>

The sizes are dependent upon the total available space. All of the hard disk memory must be allocated to one partition or another. When you shift space from any partition, it will affect the space of the next partition.

Allot the sizes to higher number partitions in a "trickle down" method; pass memory from the partitions with lower numbers to the partitions with higher numbers.

```
LOCK    NAME     SIZE  ON SYSTEM  BOOT
1              20000.0K   CLEAR
2               5000.0K   CLEAR
3               5000.0K   CLEAR
4               5000.0K   CLEAR
5               2500.0K   PASCAL
6               2500.0K   CP/M
7                   .0K   CLEAR
...
```

In the example above, partitions 1-4 would be the only ones affected by a SIZE change because 5 and 6 are not clear.

❖ *Important:* After changing the size of the partition, you'll need to reset the SYSTEM and FORMAT.

Turning Partitions On or Off

Although you can segment the drive into 16 partitions, due to the restrictions imposed by the various operating systems, all 16 cannot be active at once. You can have four active partitions at one time under ProDOS and CP/M. DOS 3.3 and Pascal, however, allow only two partitions at one time.

You can decide which partition you want to use during a particular session by turning them ON (*) or OFF (blank). When a drive is off (inactive), it will not be recognized by the computer but all data stored within that partition is saved. It's like saving files to a disk and then pulling the disk out of the drive.

❖ *Note:* You can also turn on and off the partitions from the Vulcan CDA. Refer to Appendix B.

Because ProDOS can recognize only 8 online volumes, you may want to have less than four drives active depending on your system's setup.

For example, if you have two 5.25" drives, two 3.5" drives and a RAM disk, you would only want three Vulcan partitions active. If you have four turned on, one drive unit will not show up properly.

Another example: teachers can use different partitions to store different classes' files. They can turn off all the partitions except for the current class'.

To turn the partition ON or OFF while in the MODIFY mode:

1) Move the cursor to the ON column of the partition you want to turn ON or OFF.
2) Press <return> to toggle between the ON setting (*) and the OFF setting (blank).

❖ *Note:* If you have the maximum number of partitions for the operating system turned ON, when you attempt to turn another one ON, the PM will beep and not let you.

3) Use the arrow keys to move to your next option or press <esc> to return to the main menu.

Selecting the Operating System

Under the SYSTEM option, the Partition Manager gives you five settings from which to choose. These are:

PRODOS
PASCAL
DOS 3.3
CP/M
CLEAR

❖ *IMPORTANT:* If you currently have files within the partitions for which you are changing the SYSTEM setting, you'll lose these files. If there is information that is valuable to you on these partitions, back them up before making any changes.

When selecting an operating system, while in the MODIFY mode you'll need to:

1) Unlock the partitions for which you want to chose a system. Refer to "Locking/Unlocking Partitions" above.
2) Move the cursor to the SYSTEM column of the partition you want to resize.
3) Press <return>.
4) Use the arrow keys or I, J, K, M keys to toggle through the system options until you reach the desired system.
5) Press <return>.
6) Changing systems automatically turns off that partition so turn on the partition if you want it active.

After you've selected a system, you'll still need to format the partition by using the FORMAT option before you can actually use the partition for file storage and booting.

Selecting the Boot Partition

The boot flag tells the computer which partition to go to at startup.

❖ *Note:* You can also set the boot partition from the Vulcan CDA. Refer to Appendix B.

Booting Rules

When selecting a boot partition keep the following rules in mind:

- ❑ You can have only *one* partition set to boot.
- ❑ The partition you set to boot can be any of the four operating systems.
- ❑ The boot partition does *not* have to be the first partition of that operating system.
- ❑ The boot partition must have the boot files required for that system copied into the partition.
- ❑ Under DOS 3.3, the first volume of the boot partition must contain the boot files.
- ❑ To boot from a Vulcan partition, you'll need to have the Startup Slot set to the slot containing the Vulcan's controller card or to slot 7 if you're pseudo-slotting the card. (Refer to Ch. 1, *Slot 7 Exception*, for information about pseudo-slotting.)
- ❑ If you do not set the Startup Slot to the Vulcan's drive, the computer will ignore the Partition Manager's boot flag.

Set Boot Partition

To set the boot partition, while in MODIFY mode:

1) If there is not already an asterisk in the boot column of the partition you want to boot from, move the cursor to that column.
2) Press <return>.

The asterisk will be removed from its current position and will appear in that column you currently have selected.

Leaving MODIFY Mode

Before Leaving

Before you leave MODIFY mode, make sure your settings are the way you want them.

- ❑ Have you set the partition to the system you want?
- ❑ Are the partitions you want active turned ON?...

How To Leave

To leave the MODIFY mode and return to the top of the menu, press <esc>. If you have made any changes to the partitions, you will be asked if you want to save (UPDATE) or cancel (UNDO) the modifications. (See below.)

Canceling/Saving Changes

When you leave the MODIFY mode, you're asked if you want to UPDATE or UNDO the changes you have made.

To	Press
Save modifications	Y
Cancel modifications	N
Return to MODIFY mode	<esc>

Updating the changes will save the changes you have made and leave you in the main menu. You'll need to format any modified partitions to make them useable.

Undoing the modifications will reset the partition table to the settings it had before you last entered the MODIFY mode and leave you in the main menu.

<esc> will return you to the last position you were in on the partition table with all recent modifications unchanged.

Formatting

❖ *Note:* Formatting will completely erase everything that may still reside on the partition being formatted. You should have all important files backed up by this time.

Once you have your partitions set to the desired size and operating system, you'll want to format the partition for their particular system so they can be written to and read from.

❖ *Note:* You don't need to alter the partitions to reformat; you can leave the partitions unmodified and still use the format command.

To format a partition:

1) While in the top part of the menu, select FORMAT.
2) Press <return>.

A selection bar will appear over the partition rows.

3) Use the arrow keys to select the partition you want to format.
4) When you have the selection bar over the desired partition, press <return>.

The Partition Manager will format the partition according to the system you have chosen for that partition.

❖ *Note:* In DOS 3.3, you can set up several different volumes per drive. You'll be asked how many small volumes (140K) you want. The rest of the space will be used for large volumes (400K). As you select how many 140K drives you want, the format table will update the number of 400K drives to be formatted and tell you how much disk space is unused. *You'll need at least one 140K drive if you want to boot from that DOS partition.*

5) Select another partition to format or press <esc> to return to the main menu.

Print

The PRINT option lets you print the current PM screen if you have a printer online. You may want to print after making modifications to the PM to remind you of your current settings.

To print the current setup, select PRINT from the top part of the menu, type in the slot number of your printer (or <esc> to cancel) and then press <return>.

Quit

When you're ready to leave the Partition Manager, use the QUIT option.

Final Check

Before you leave the PM, check your settings to make sure they are as you want them.

- ❑ Have you formatted the resized and new partitions?
- ❑ Are the partitions you want active turned on?
- ❑ Do you have the boot flag set to the proper partition?

Quitting

You can leave the PM by selecting QUIT from the top part of the menu followed by <return>.

Once you've saved the modifications and formatted the partitions, you can copy files to the active partitions or restore files from the backups.

CHAPTER FOUR

DOS 3.3, Pascal, and CP/M

If you rarely use DOS 3.3, Pascal, or CP/M you'll probably be better off running them from floppy and using your Vulcan to run ProDOS only. However, if you're a frequent user of DOS 3.3, Pascal, or CP/M read this chapter to quickly set up partitions for the different systems.

You must be within a partition's operating system before you can copy files to it. For example, you can't copy to the DOS 3.3 partitions while in ProDOS. Only the partitions that are currently ON and contain the system currently booted will be recognized.

Use this chapter to quickly set up partitions for DOS 3.3, Pascal or CP/M. Refer to Chapter 3 for specific instructions and rules about using the Partition Manager.

DOS 3.3

DOS 3.3

The following is an abbreviated, step-by-step guide to setting up a DOS 3.3 partition. The instructions assume that your Vulcan is either installed in or pseudo-slotted to Slot 7 and that your 5.25" Vulcan Utility disk is in Slot 6, Drive 1. If you have your system configured differently, modify the steps accordingly.

1) Boot the Vulcan and run the Partition Manager. (Refer to the previous chapter for instructions.)
2) Choose "MODIFY" from the Partition Manager menu.
3) Set up the number of partition(s) you want for DOS 3.3 and turn the partition(s) on. You can turn on up to *two* DOS 3.3 partitions at a time.
4) Format the partition(s). The first volume must be a 140K volume for the partition to be bootable.
5) Quit the Partition Manager.

6) Boot the back of the Vulcan 5.25" disk. (Run BASIC.SYSTEM, type PR#6 at the prompt and then press the <return> key.)

7) From the menu, select "8" Install Vulcan Patch then press any key to return to the menu.

8) Press "9" to quit to the BASIC prompt.

9) Type IN#7 and press Return. This informs DOS 3.3 that your Vulcan is in Slot 7. You should see two flashing cursors on your screen.

10) Insert the disk in the drive containing the HELLO program you want to load onto the Vulcan. You can leave the Vulcan DOS 3.3 Utilities disk in the drive if you want to boot into the Vulcan Main Menu.

11) Type "LOAD HELLO, S6" and press <return>.

12) Type "INIT HELLO, S7,D1,V1" and press <return>. If an I/O error occurs, you didn't install the Vulcan patch. Go back to step 6.

13) With the Vulcan DOS 3.3 Utilities disk in S6, D1, type, "RUN HELLO, S6."

14) Press "8" -- INSTALL VULCAN PATCH and then press any key to return to the menu.

15) Press "5" -- AE FID.

16) Press "1" -- COPY FILES and <return>.

```
    SOURCE SLOT? 6
         DRIVE? 1
DESTINATION SLOT? 7
         DRIVE? 1
        VOLUME? 1
```

When copying other DOS 3.3 files to the Vulcan, run FID and enter the desired Destination Volume. For example, with a 1340K DOS 3.3 partition, you may have three 400K volumes in addition to the first volume of 140K. You can set the Destination Volume to any one of the five.

```
FILENAME? =
```

The equal sign is a wildcard meaning "copy all files." If you want to copy only specific files, enter the names of the files at this prompt.


```
DO YOU WANT PROMPTING? (Y/N) N
```

17) Press "9" to quit when the copy routine is complete.

Booting from the DOS 3.3 Partition

To make the DOS 3.3 partition bootable, run the Vulcan CDA and select the DOS 3.3 partition as the Boot Partition. Refer to Appendix B for Vulcan CDA instructions.

Patched DOS 3.3 Notes

The version of DOS you've installed with the INIT HELLO command is a patched version. The patched version allow DOS to accept lowercase letters, reduces loading time, and corrects an error in the append command.

Do not use this version to INIT floppy disks. The patched version will look for a Vulcan and will not boot if it cannot find one. Instead, use the unmodified version of DOS 3.3 included on the floppy disk to INIT other floppy disks.

If you change the Vulcan's slot, you'll need to repeat the process detailed in the two sections above. The patched version expects to find the Vulcan in a particular slot. If you switch slots, DOS won't be able to find the Vulcan until you repeat the necessary steps.

Volume Sizes

The sizes of the DOS 3.3 volumes depend upon the sizes you chose while in the Partition Manager. Use the chart below to determine the maximum number of files each of your DOS 3.3 volumes will hold.

Partition Size	Maximum Files
140K	105
400K	217

Copying Files to the DOS 3.3 Partition

Non copy-protected DOS 3.3 files can be copied to the DOS 3.3 partition(s) using Æ's own version of Apple **FI**le **D**eveloper program (FID) included on the Vulcan's DOS 3.3 floppy disk. By now, you've probably already used FID to copy the boot files to your DOS partition.

FID is a binary program which will copy DOS 3.3 files and applications from one disk to another. Apple's original version does not recognize hard drives as an option. We've modified the version included on the Vulcan's DOS 3.3 disk to recognize the Vulcan's DOS 3.3 partitions and allow you to copy files to them.

To execute AE FID,

Either:

1) Boot Vulcan's DOS 3.3 floppy disk.
2) Select AE FID from the main menu.

Or:

1) Run BASIC.
2) Type BRUN AE.FID at the BASIC prompt ( ]) with Vulcan's DOS 3.3 floppy disk in an on-line drive.

Once the program is running, follow the steps below to copy files to your DOS 3.3 partition(s).

❖ *Note:* The following instructions assume that you've already formatted the volume you're copying to and that you are copying from your Slot 6, Drive 1 5.25" drive to a Vulcan partition in Slot 7.

You can exit from most parts of the program by pressing <esc>.

Type (followed by <return>)	**Result**
1	Selects option 1 (Copy Files) from the AE FID main menu.
6 (or floppy drive slot)	Specifies slot 6 as the source slot.
1	Specifies drive 1 as the source drive.
7 (or Vulcan's Slot)	Specifies slot 7 (or whichever slot Vulcan is set up for) as the destination slot.

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Applied Engineering congratulates you on your purchase of one of our enhancement products. With proper installation and care, your Æ enhancement product will provide you with years of trouble-free operation.

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To our valued customer-
Please complete and mail as soon as possible.

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Zip _____ Telephone: Home ( )____ - _____ Business ( )____ - _____

Computer Model _____ Other Computers _____

Purchased From _____

Address _____

Important: Proof of purchase is required when requesting service under warranty. See the warranty procedure for additional information.

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Should you experience a problem requiring technical assistance, please contact our Technical Service Department. See the included Return Merchandise Sheet for more information about the returns procedure.

In the event that warranty service is required, send your product together with your invoice or Bill of Sale (legible photocopy acceptable) along with your completed return form.

Important: To avoid a handling charge, your invoice or Bill of Sale must accompany any product returned for warranty service. Out-of-warranty repair will be subject to a handling charge and/or a service charge.

Ship your equipment in its original carton or equivalent, fully insured and prepaid. Please include (on the return form) a complete description of the equipment used and the problems experienced. If you do not have a return form, provide a complete description of your equipment (computer model, installed peripherals, etc.) and the problems (including software used when problem encountered) in a letter to be shipped with the returned product.

Detach Here

Attach Stamp Here

Applied Engineering
P.O. Box 5100
Carrollton, TX 75011

Attention!
Return Merchandise Sheet
(Remove from Manual and Save)

In order to obtain the maximum benefits from your investment, please read your user manual first to fully understand your product's capabilities. If you feel you still need technical assistance or suspect you have a defective product, please contact the dealer from whom you purchased the card. If you are experiencing difficulties with one particular program, contact the program's author or publisher.

In the event that the dealer or the software publisher's support personnel cannot answer your question, call Applied Engineering Technical Support. Please provide Technical Support with the following information:

- ◊ The Applied Engineering product related to your question and its revision number
- ◊ The original and current memory configuration of the card (if applicable)
- ◊ The model and revision of your computer
- ◊ What peripherals are being used and what cards are in each slot
- ◊ The name, version, and revision level of the software with which you are experiencing problems
- ◊ The results of any test programs, diagnostics, or troubleshooting done by you, your dealer, or your software publisher's support department

If an AE technician determins that the product needs to be returned, you will receive a Return Material Authorization (RMA) number. Once the RMA# has been issued, please complete the form on the back of this page and send it along with the defective product and a copy of your original invoice to:

RMA# _____
Applied Engineering
Technical Support
3210 Belt Line Road, Suite 154
Dallas, TX 75234

The returned product may be subject to a service charge if:

1) it is sent to technical support without an invoice,
2) our test results show that the product is not defective,
3) the product is not in its original AE memory configuration.

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Technical Support
Voice Lines-
Mac/Amiga (214) 241-6084
Apple II (214) 241-6069
9 AM to 12:30 PM & 1:35 PM to 5 PM(CST) Monday through Friday
Bulletin Board System - (214) 241-6677
300/1200/2400 baud 8 Bit, No Parity, Full Duplex, MNP-5
24 Hours, 7 Days a Week

Return Form

Return Address:

_____

_____

_____

Daytime Phone:

_____

RMA# _____
Applied Engineering
Technical Support
3210 Belt Line Road, Suite 154
Dallas, TX 75234

cut out and tape or glue to package

Computer **Model**

- ❑ Amiga _____
- ❑ Apple II _____ IIGS ROM # _____
- ❑ Macintosh _____
- ❑ Other _____

Peripherals:

- ❑ Monitor _____
- ❑ Printer _____
- ❑ Modem _____
- ❑ Cards & Slot Positions

_____

_____

Symptoms: _____

_____

_____

_____

_____

_____

_____

Description of Software (system, application, version, enhancements, etc.): _____

_____

_____

_____

_____

_____

_____

Steps to Duplicate Problem: (IIGS users include slot settings) _____

_____

_____

_____

_____

_____

`1`	Specifies drive 1 as the destination drive.
`1`	Specifies volume 1 as the destination volume.
`AE.FID` (or `=`)	Specifies filename of first file to copy. The equal sign (`=`) is a wild card character meaning "copy all".

Repeat the above steps for each file you want copied or, if you've pressed "=", you won't need to repeat the steps for individual file copying.

`S` (or any key)	Returns you to the AE FID menu.
`9`	Quits and returns you to the BASIC prompt.
`CATALOG`	Lists the directory of the destination disk.

The Rest of FID

Following is a description of each of AE FID's menu options.

<1> COPY FILES

As in the instructions above, this command lets you transfer files from source to destination. Use "=" (equal sign) for "copy all." You can also use it to copy all files with certain letters. For example, =FX= will copy all file with FX in the name.

Prompting will list each file and wait for you to type "Y" to copy or "N" to skip to the next file.

<2> CATALOG

This command gives you a directory listing of the DOS volumes currently online.

The first time you select this option in a session, you'll be asked to specify the slot, drive, and volume. The subsequent times, you'll be returned to the volume last chosen. To view a different volume, use <7> RESET SLOT AND DRIVE before pressing <2> again.

<3> SPACE ON DISK

Use this command to show the amount of space (sectors) free and used for each volume.

140K volumes will have 528 sectors free after initializing. 400K volumes will have 1536 sectors free. If you use INIT to write a boot image to volume 1, you'll have 490 sectors free. (V1 must be a 140K volume).

The first time you select this option in a session, you'll be asked to specify the slot, drive, and volume. The subsequent times, you'll be returned to the volume last chosen. To view a different volume, use <7> RESET SLOT AND DRIVE before pressing <3> again.

<4> UNLOCK FILES

To unlock individual files, use this command.

The first time you select this option in a session, you'll be asked to specify the slot, drive, and volume. The subsequent times, you'll be returned to the volume last chosen. To work with a different volume, use <7> RESET SLOT AND DRIVE before pressing <3> again.

Use "=" (equal sign) for "unlock all." This is most often easier than trying to remember specific filenames.

When you use "=" you'll be asked if you want prompting. Prompting will list each file and wait for you to type "Y" to unlock or "N" to skip to the next file.

<5> LOCK FILES

Same as above but for Locking instead of Unlocking individual files.

<6> DELETE FILES

Permanently erases files from the disk. DELETE uses the same operation method as LOCK and UNLOCK.

<7> RESET SLOT & DRIVE

Use this command to reset the slot, drive, and volume selection of options 1-6 and 8. After selecting this option, the other options will again ask you to specify the slot, drive, and volume numbers.

<8> VERIFY FILES

This option makes sure that the files are as they should be. Same operation method as UNLOCK.

<9> QUIT

The QUIT option exits FID and returns you to the main menu or to the BASIC prompt.

Other DOS 3.3 Goodies

We've included some other helpful utilities on the DOS 3.3 disk.

Run Volume 2 Hello - Runs Hello program on V2 of the same partition.
Park Heads - Moves hard drive's heads to safe place. Use just before shut down.
Catalog All Volumes - complete listing of all DOS 3.3 volumes in active partition. (Press any key for next volume, <return> or <esc> for main menu.)
Edit Volume Names - allows you to changes names of volumes.
AE FID - utility that enables you to copy, lock, unlock, delete, and verify files and more.
Partition Manager - DOS version of Vulcan's Partition Manager.
Remove Vulcan Patch - removes patch described below. Use before formatting floppy disks.
Install Vulcan Patch - program that patches DOS when you boot included disk and enter INIT HELLO command. Allows DOS 3.3 to accept lower case characters, loads system faster, and fixes bug in APPEND command.
Boot ProDOS Partition - Boots first active Vulcan ProDOS partition. BRUN from main directory.

CP/M

Vulcan can be partitioned to run Æ's version of the CP/M operating system, CP/AM. CP/AM software is included with the Z-80 Plus and Z-80c cards. The following is an abbreviated, step-by-step guide to setting up a CP/AM partition. The instructions assume that your Vulcan is either installed in or pseudo-slotted to Slot 7 and that your 5.25" Vulcan Utility disk is in Slot 6, Drive 1. If you have your system configure differently, modify the steps accordingly.

1) Boot the Vulcan and run the Partition Manager. (Refer to Chapter 3 for instructions on running Partition Manager).
2) Choose "MODIFY" from the Partition Manager menu.
3) Set up the number of partition(s) you want for CP/AM and turn the partition(s) on. You can turn on up to *four* CP/AM partitions at a time.
4) Set the boot star to the CP/AM partition from which you want to boot.
5) Quit the Partition Manager. You don't need to Format the partitions yet.
6) Enter the Control Panel and set the Z-80 card's slot to "Your Card" if it is not already set.
7) Boot into the CP/AM system (disk in Slot 6).
8) Run the PC.COM program.
9) Press "A" to select Add Devices.
10) Press "7" to register the Vulcan Slot.
11) Press "B" to install Vulcan as the (B:) drive.
12) Press "S" to set the last valid device.
13) Press "B" to select Vulcan as the last valid device.
14) Press Return to save the configuration.
15) Press "Y".
16) Press Return. You should be at the (A:) prompt.
17) Type "PIP A:=B:*.*" -- this copies all the files from the A drive to the B drive.
18) Run the PC.COM program again.
19) Change the specified A drive to be the Vulcan.
20) Change the specified B drive to be the 5.25" drive.

    Make sure to follow the prompts and save the configuration.
21) Go back to ProDOS, enter the Control Panel, and set Slot 7 (the Vulcan's slot) as the boot slot.
22) Reboot the system.

After following these steps the first time, you can run CP/AM anytime by using the Vulcan CDA to select the CP/AM partition as the boot partition and then rebooting. Refer to Appendix B for Vulcan CDA instructions.

Pascal

❖ *Note:* You must use Pascal 1.3 with the Vulcan and the controller card must be in slot 4, 5, or 6 with pseudo-slotting disabled.

Once you've set up and formatted your Pascal partitions and have one or two turned ON (as described in the previous chapter), the partition is ready to use. Copy to it from your Pascal disks as you would to a floppy. Be sure to copy the necessary system files to the boot partition. Keep in mind that Pascal has a maximum file limit of 77 files.

Chapter Five

Backing Up the Vulcan

Introduction

Because Vulcan's partitions act as separate disks, you'll need to backup the partitions separately.

We've included Apple Computer's Backup II program on the ProDOS partition of the Vulcan for backing up the ProDOS partitions.

To back up the DOS 3.3, Pascal, and CP/M partitions, use an appropriate backup program for those systems.

Backup II for ProDOS

Backup II is Apple's ProDOS volume backup program. It uses the full 800K of 3.5" disks by segmenting the files to conserve space. This means that if it is in the middle of copying a file when it runs out of room on one disk, it finishes that file on the next disk. When you restore, the segments are rejoined.

❖ *Note:* If you don't understand what pathnames, files, folders, or directories are, please refer to A Brief ProDOS Tutorial in the appendices of this manual.

Number of Disks Required

Refer to the chart below to determine about how many disks it will take to back up your ProDOS partitions.

To back up	Requires	Or
20 Meg	25 800K disks	143 140K disks
40 Meg	50 800K disks	286 140K disks
100 Meg	125 800K disks	714 140K disks

If the drives are not completely full, it will probably take fewer disks for the backup.

Suggested Backup Schedule

If you use your computer constantly, we recommend that you make a backup of the entire hard disk on a weekly basis and back up individual modified files daily. If you don't use your computer that much, a bimonthly or even monthly full backup may be all you need. But always back up any important documents after creating or modifying them.

Before You Back Up

You should have plenty of disks and labels ready as well as a marker to label the backups.

❖ *Note:* Format the disks first. While Backup II will format the disks, it will run quite a bit faster and require you to answer less prompts if you format first. Backup II renames the disks with its own sequence of names so it does not matter what you call them when you format.

Running Backup II

To run Backup II, double-click the Backup II icon on the Finder.

You can also run the program from any other program selectors that you use. Select BACKUPII.

Once in the program, you'll be given three options as shown below:

```
1. Backup Files
2. Restore Files
3. Quit
```

Backup Entire ProDOS Partition

If you use your computer heavily, you should backup your entire hard disk weekly. Light users may feel comfortable with making backups bimonthly or even monthly.

To backup the entire contents of the Vulcan, follow these steps:

❖ *Note:* Remember that it's much quicker to preformat the disks instead of letting Backup II do it. Refer to the chart at the beginning of this chapter to get an idea of how many disks to preformat.

1) Run Backup II.
2) Label one of the blank formatted disks /BU1 along with the date and insert it into the drive to which you'll be backing up.
3) While in the main menu, press 1 and then the <return> key. This selects the "Backup Files" option.

```
> 1. Backup Files
  2. Restore Files
  3. Quit
```

4) Press 2 <return> to select "Backup by pathname".

```
  1. Backup modified files
> 2. Backup by pathname
  3. Return to main menu
```

5) At the "Backup from" prompt, type in a slash followed by the name of your Vulcan partition. Ex:

```
Backup from:
(/VULCAN1                              )
```

This will backup the entire contents of the partition.

6) Press <return>.
7) At the "To device" prompt, type in the slot number of your floppy drive (usually "5" for 3.5" and "6" for 5.25").

8) Now type in the drive number of your floppy drive.

❖ *Warning!* If you're booting from a RamKeeper, the 3.5" drive number will be 2. If you enter 5,1, you'll be writing to the RamKeeper.

```
To device:
(Slot 5 Drive 1)
```

9) Press <return>.

10) Select where to output the file list;

❖ *Note:* We recommend keeping a printed list of the disks' contents if you're able.

- ❑ Press <return> for screen only
- ❑ Press P-<return> and then the printer's slot number and <return> to send the list to the printer and screen if you have a printer connected.

Backup II will then begin the backup procedure. The program will tell you which disk it is currently backing up as well as how many total disks it needs. As it finishes filling each disk, it will send the following message to the bottom of the screen:

```
Replace with the next backup volume.
Press RETURN to continue.
```

The program names the disks /BACKUP.VOLUME*n* where *n* is the sequential number of the disk.

11) While the program is copying one disk, write the label of the next disk(/BU2 {date}, /BU3 {date}).

When it's done backing up the partition, the program will send you the message

```
Operation complete,
Press RETURN to continue.
```

If you've printed the file listing, keep it with the set of backup disks.

Repeat the process for the other ProDOS partitions you want to backup.

Backup Modified Files

You should always keep backups of any data that is important to you. If you use your computer daily, get into the habit of saving your modified files at the end of each day.

To backup modified files, follow these steps:

❖ *Note:* Do not use your set of main backup disks; use a blank formatted disk. (Again, Backup II will format but it is quicker to format beforehand.)

1) Run Backup II.

2) Label one of the blank formatted disks /MOD1 along with the date and insert it into the drive you'll be backing up to.

3) From Backup II's main menu, press the B key on your keyboard. This selects the "Backup Files" option.

```
> 1. Backup Files
  2. Restore Files
  3. Quit
```

4) Press 1 <return> to select "Backup modified files".

```
> 1. Backup modified files
  2. Backup by pathname
  3. Return to main menu
```

5) At the "Backup from" prompt, type in a slash followed by the name of your Vulcan partition. Ex:

```
Backup from:
(/VULCAN1
                          )
```

6) Press <return>.

7) At the "To device" prompt, type in the slot number of your floppy drive (usually "5" for 3.5" and "6" for 5.25").

8) Now type in the drive number of your floppy drive (usually 1, if you're booting from a RamKeeper however, the 3.5" drive number will be 2).

9) Press <return>.

10) Select where to output the file list;

❖ *Note:* We recommend keeping a printed list of the disks' contents if you're able.

- ❑ Press <return> to send the list to the screen only
- ❑ Press P-<return> and then the printer's slot number and <return> to send the list to the printer and screen if you have a printer connected.

Backup II will then begin constructing a table of contents. The program will tell you which disk it is currently backing up as well as how many total disks it needs.

11) While the program is copying one disk, write the label of the next (/MOD2 {date}, /MOD3 {date}).

Listing Files

To get a printout of the backup disk contents at any time, run Backup II aand select List Files from the Restore Files menu.

Restore Individual Files

If a particular file or group of files gets corrupted, lost, stolen, etc., you can restore that file or group from a backup by doing the following:

❖ *Note:* If you're restoring a file or folder that already exists, the existing file or folder will be replaced by the restored version.

1) Run Backup II.

2) Insert the disk containing the file you'll be restoring into the proper floppy drive.

❖ *Note:* If you don't have a list of what files are on what disks, you can list the contents of each disk following the instructions under the *Listing Files* section above.

3) From Backup II's main menu, press the R key on your keyboard. This selects the "Restore Files" option.

```
  1. Backup Files
> 2. Restore Files
  3. Quit
```

4) Press 2 <return> to select "Restore by pathname".

```
  1. Restore entire volume
> 2. Restore by pathname
  3. List files on backup media
  4. Return to main menu
```

5) At the "Restore from" prompt, type in the slot number of your floppy drive (usually "5" for 3.5" drives.)

6) Now type in the drive number of your floppy drive (usually 1, however, the 3.5" drive number will be 2 if you're booting from a RamKeeper).

```
Restore from:
(Slot 5, Drive 1)
```

7) You'll then be given the pathname of the disk in the floppy drive, ex:

```
Restore from:
(/BACKUP.VOLUME11/                    )
```

8) Enter the pathname of the file or directory you want to restore, ex:

```
Restore from:
(/BACKUP.VOLUME11/MY.FILES          )
```

In this example, if MY.FILES was a directory, the entire directory would be restored.

9) Press <return>.

10) At the "Restore to the directory" prompt, type in the name of the directory (and the pathname if so desired) to which you'll be restoring the file or files, ex:

```
To the directory:
(/VULCAN1                           )
```

11) Select where to output the restored file list;

- ❑ Press <return> to send the list to the screen only
- ❑ Press P-<return> and then the printer's slot number and <return> to send the list to the printer and screen if you have a printer connected.

Backup II will then begin the restore procedure. The program will tell you which file is currently being restored. When it's done, it will give you the message,

```
OPERATION COMPLETE,
PRESS SPACE TO CONTINUE
```

Restore Entire Volume

If you need to restore your entire volume, follow the same general procedure as for restoring individual files. The program will caution you that restoring an entire volume may delete files that were not there when you backed up the volume.

Also make sure that you have enough space on your volume to replace all the files you backed up.

APPENDICES

The following appendices are included for further reference and reading enjoyment:

A -- Trouble Shooting

B -- The Vulcan Classic Desk Accessory

C -- Hardware

D -- Interleaver

E -- A Brief ProDOS Tutorial

F -- Getting Help

APPENDIX A

Trouble Shooting

If you can't boot

- ❑ trouble shootingCheck the switch settings (refer to chapters 1 and 2).
- ❑ Check which drive is set to boot under the Partition Manager.
- ❑ Is the boot partition turned ON under the Partition Manager?
- ❑ Does the partition set to boot contain the necessary boot files?
- ❑ Turn off the computer then see if the controller card and cables are correctly installed.
- ❑ Make sure the Startup Device is set to the Vulcan's slot in the Slots option of the IIGS Control Panel.
- ❑ If you're trying to run a particular program and it won't boot, check the system version of the software's master disk(s). It may not be GS/OS 5.0- compatible. To remedy this, you may need to set up a separate partition with the software's operating system installed and boot from that partition to run the program.

ProDOS Can't Find All Four Vulcan Partitions

Two Drive Devices per Slot

ProDOS 8 has a limit of two drive devices per slot (except for Slot 5). For ProDOS 8 to recognize three or four active partitions, you'll need to copy the patched version of ProDOS to your boot disks. The patched version of ProDOS is included on the Vulcan's first ProDOS partition (as shipped) and on the Vulcan's 3.5" and 5.25" ProDOS disk in the System directory/folder.

- ❖ *Note:* GS/OS users will need to copy P8 and START.GS.OS, not PRODOS.

Eight Total Drive Devices

ProDOS can access a maximum of eight drive devices. If you have more than eight drive devices under ProDOS (a RAM disk, two 3.5" disk drives, two 5.25" disk drives and four ProDOS Vulcan partitions), one of the drives will not be recognized. You'll need to either turn off one of the Vulcan partitions or disable one of the other drive devices.

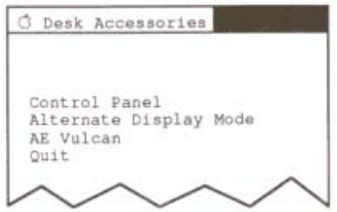
APPENDIX B

The Vulcan Classic Desk Accessory

Included in the System folder on the first Vulcan partition is a Classic Desk Accessory that allows you to set the boot partition, write protect individual partitions, or park the Vulcan's heads.

Accessing the Desk Accessory

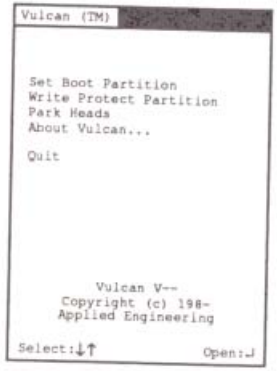
Vulcan Classic Desk AccessoryAccess the Classic Desk Accessories menu by holding down the OA and <control> keys while pressing <esc>. Pressing these three keys will display a Desk Accessories menu much like the one shown below (appearance may vary according to which Desk Accessories you have loaded).



Classic Desk Accessories Menu

Use the up and down arrow keys to highlight the Vulcan option. Press <return>.

The Vulcan main menu will appear as shown following:



Vulcan Main Menu

Again, use the up and down arrow keys to select the option. The different options and their functions are described below.

Set Boot Partition

Vulcan Classic Desk AccessoryChoose this option to select from which partition you want to boot. A check mark appears next to the partition currently set to boot.

To change the boot partition, follow these steps:

1) Use the up or down arrow keys to highlight the partition you want to set as the boot partition.
2) Use the left or right arrow key to move the check mark to the highlighted partition.
3) Press <return> to return to the Vulcan main menu or <esc> to leave the boot partition as it was.

❖ *Note:* You must set the Startup Slot (in the Slots option of the Control Panel menu) to the Vulcan's slot before the partition boot setting will be active.

Write Protect Partition

Activating the write protect feature is the same in function as write protecting a floppy disk. You will not be able to store new information to the write protected partitions.

To write protect a partition, follow these steps:

1) Use the up or down arrow keys to highlight the partition you want to write protect.
2) Use the left or right arrow key to put an asterisk beside any partition you want to protect.
3) Press <return> to return to the Vulcan main menu or <esc> to leave the Write Protection menu as it was.

❖ *Note:* You must reboot before the write protection can take effect.

Park Heads

Vulcan Classic Desk AccessoryParking the heads moves the read/write heads to a more durable part of the hard disk to reduce the risk of damaging the drives when the hard disk is being moved. You don't really need to park the heads unless you plan to move your computer.

❖ *Note:* If you press <esc> after selecting the Park Heads option, you'll be returned to the Vulcan main menu and the heads will no longer be parked.

About Vulcan...

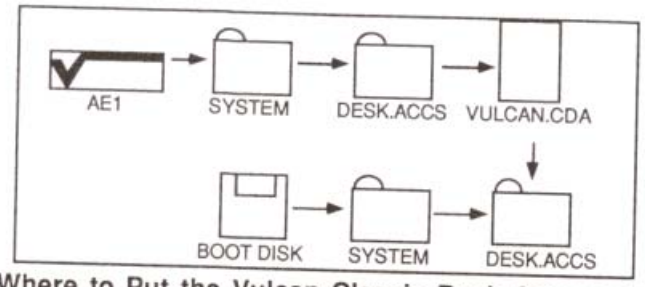
About Vulcan tells you the version number of the Vulcan Desk Accessory, tells you who created the Vulcan, and gives you the numbers for Sales and Tech Support.

Quit

Selecting Quit returns you to the Desk Accessories main menu.

Copy the Vulcan CDA to Your Boot Disk

If booting from a disk other than AE1, you'll need to copy the Vulcan desk accessory to the boot disk's Desk Accessory folder in the System folder.



Where to Put the Vulcan Classic Desk Accessory

You can also use your favorite copy program to copy the driver.

Source: `/AE1/SYSTEM/DESK.ACCS/VULCAN.CDA`

Destination: `/YOUR.BOOT.DISK/SYSTEM/DESK.ACCS`

where `/AE1` is the name of your Vulcan GS/OS partition and `/YOUR.BOOT.DISK` is the name of the disk to which you're copying.

Now when you boot from the disk, the Vulcan Classic Desk Accessory will be loaded.

APPENDIX C

Hardware

Switches

The controller card has a block of four switches located in the lower right hand corner.

What They Do

Switch 1, Interrupt Enable - This switch must be closed in order for any interrupts generated by the Hard Drive to pass through to the Apple. (Interrupts are not used at this time.)

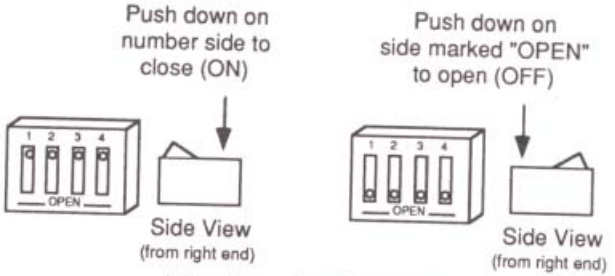
Switch 2, PS Enable - When pseudo-slotting in the Apple IIGS, this switch must be closed. When pseudo-slotting in a //e or][+, this switch must be open.

Switch 3,][+ Boot Enable - Leaving this switch open allows a II+ or an unenhanced //e to boot directly from the hard disk. If the hard disk is not to be the boot device in these systems, this switch should be closed. In a IIGS or an enhanced //e, this switch should also be closed.

Switch 4, Pseudo-Slot Enable - When this switch is closed, the controller card will show up in slot 7, no matter which slot it is in. With it open, the card uses the slot in which it is placed.

How To Set Them

To change the switch settings, use a small, pointed object, like a wooden toothpick or bent-out paperclip. The circle on each switch represents the end that is pressed.


Push down on number side to close (ON)
Push down on side marked "OPEN" to open (OFF)
1 2 3 4
OPEN
Side View (from right end)
Side View (from right end)

Flipping the Switches

Remote Light Jack

In addition to the on-board LED, there is a two pin connector for a remote drive activity indicator LED.

Applied Engineering offers an LED extension option. Call Æ Sales to order at (214) 241-6060.

If you're so inclined, you can make an extension light to run from the connector and attach it under the front panel next to the green LED. Make sure that no wires are exposed; any exposed wires may short out the motherboard.

> ❖ *Warning:* Applied Engineering is not responsible for any damage resulting from modifications to your computer.

The connector is wired as follows:

Pin 1 (the right pin when facing the board from the chip side right side up) Anode of the LED

Pin 2 Cathode of the LED

With the lid off, remove the front panel by releasing the three tabs under the front edge of the computer.

Note the "pocket" in back of the clear window on the underside of the front panel where the green LED shines through. It is possible to fit an LED into this pocket.

APPENDIX D

"Interleaver" (20 and 40 Megs only)

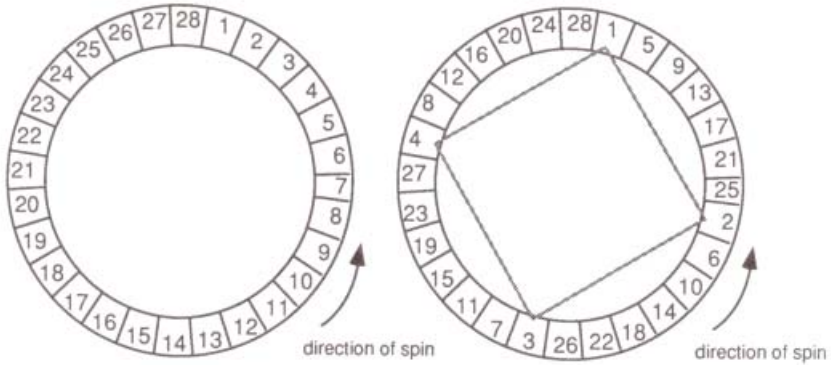
The program, Interleaver, is included for those who want to get all the speed possible from their Vulcan for their most used application. First, we'll give a brief overview of what interleave is. If, after reading the description, you decide you want to try to optimize your setup, carefully follow the directions for using Interleaver.

> ❖ *Warning:* Changing the interleave of your hard drive is not necessary--generally, the interleave to which we set your drive works well for most applications. Interleaver copies and rewrites your hard drive's contents. So, unless you understand what you're doing, ***you could do more harm than good.***

About Interleave

A disk's interleave is the manner in which the disk is set up to be read. Each track on the disk is divided into several sectors, totaling anywhere from 26 to 32 depending upon the manufacturer. When information is pulled from a disk, the different sectors are read one at a time. The whole time the computer is retrieving the information, the disk is spinning. The first sector that the program accesses is read and processed and then the computer looks for the next sector. If the information is still being processed from the first sector when the second sector spins by, the computer will have to wait for the disk to rotate completely around to read the second sector.

The interleave determines the order of the sectors. With a 1:1 interleave, sector two immediately follows sector one. With a 2:1 interleave, every other sector is numbered, so that sector two is physically the third sector. Interleaves can be set up to one less than the number of sectors on a disk (e.g. 25:1 on a 26 sector disk).



1:1 Interleave **7:1 Interleave**

Programs differ in their methods of getting information from disk. So while one program that can read and process information very quickly may work more effectively at a 1:1 interleave, a slower program may need a 15:1 ratio to work optimally.

The Vulcans are formatted with an interleave that will run most applications at a fairly quick speed. If, however, you want to experiment and see how your most often used programs perform at different interleaves, you can change the Vulcan's interleave and time your various programs performing standard operations (opening files, spreadsheet calculations, formatting, etc.). Keep in mind that while *one* of your programs may perform optimally at a given interleave, another may suffer a significant speed decrease.

Using Interleaver

Following is a list of the things to keep in mind when using Interleaver:

- ❑ Make a note of the interleave to which your drive was set when shipped. You may want to set it back to the factory set interleave.
- ❑ Interleaver will not destroy the data stored on the Vulcan drive if run normally. But do not stop the program until it has finished.

❖ ***Warning:*** **DO NOT RESET WHILE THE PROGRAM IS RUNNING!** Interleaver is copying and rewriting tracks. If you stop the program in mid-stream, your data will be corrupted.

- ❑ You can run the program from the Vulcan or from floppy.
- ❑ The program can take up to 30 minutes depending upon the size of your disk and how full it is.
- ❑ Before you run the program, run your most frequently used programs and time them doing various tasks.
- ❑ Changing the interleave does not help a drive that uses track caching. The 100 Meg Vulcan uses track caching.
- ❑ Do not set the interleave below the Native interleave (shown on the Interleave Changer screen) or performance will suffer.

❖ *Remember:* Unless you understand what you're doing, ***you could do more harm than good.***

When you run Interleaver, you'll see a version of the Interleave Changer screen following:

```
AE VULCAN INTERLEAVE CHANGER V -.--

  40 MEG VULCAN IN SLOT 7

CYLINDERS = 777  WESTERN DIGITAL
    HEADS =  4
  SECTORS =  27

INTERLEAVE FACTORS
   NATIVE =   3
  CURRENT =   7
  DESIRED =   -

ARROWS OR 'IJKM' ADJUST DESIRED VALUE
<RETURN> TO ACCEPT, <ESCAPE> TO ABORT
```

Once you've set the desired interleave using the arrow keys or the I, J, K and M keys, press Return and let the program do the rest. Once finished, quit the program and then time your programs again.

APPENDIX E

A Brief ProDOS Tutorial

This is a brief explanation of the **Pro**fessional **D**isk **O**perating **S**ystem, **ProDOS**, for those who are completely new to it. All of this information and more is included in your *Apple Owner's Guide*, but we have provided it here for your convenience.

Operating System

ProDOS is one of several operating systems for the Apple. Others include DOS 3.3 and Pascal. Operating systems, as defined in the *Apple Owner's Guides*, are programs that control how information is loaded into memory, how the computer handles the information, how the information is stored on a disk, and how the computer communicates with the printer and other peripherals.

Naming Volumes

ProDOS must have a way to locate which disk (often called "volume") you want to access. Instead of typing in the location of the disk as in DOS 3.3 (ex: S6,D1), you simply type in the name of the disk (the volume name). Some rules for volume names are

1) Name can include letters, numbers, or periods but not spaces.
2) Name must begin with a letter.
3) Name can be up to 15 characters long.

These rules also hold true for subdirectory names.

Root Directory and Subdirectory

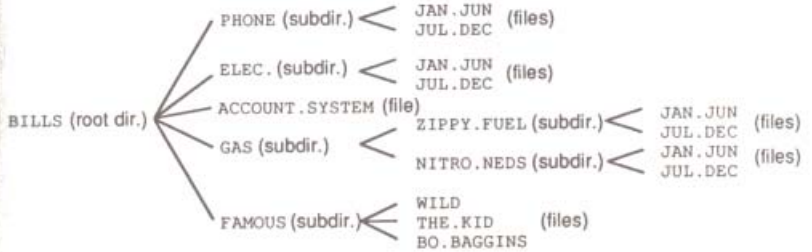
The main directory of the volume is called the root directory. The root directory uses the same name as your disk. Subdirectories are ProDOS' way of organizing information on a disk.

Think of the root directory as a file drawer and the subdirectories as folders within the drawer. You can

1) Put files directly into the root directory like putting documents straight into the file drawer.
2) Put files within subdirectories like putting documents in folders.
3) Put subdirectories within subdirectories like putting folders within folders.

Pathname

The name of the directory combined with the names of one or more subdirectories is called a pathname. Volume names and subdirectory names are preceded by a slash, "/". (Note that some applications add the slash for you.) For example, you could have a volume named `/MY.DISK` and a file called `MY.FILE` on the root directory of that disk. To access that file, you would use the pathname `/MY.DISK/MY.FILE`. You could also have a file `JUL.AUG` in a subdirectory (folder) called `PHONE` on a disk called `/BILLS`. To access that file, you would use the pathname `/BILLS/PHONE/JUL.DEC`. Refer to the diagram below.



ProDOS Directory Structure

Now when an application asks you for the pathname of a file, you'll have a basic understanding of what it expects.

System Files

A system file is a ProDOS file that starts an application. Typically, these files have the suffix .SYSTEM (e.g. /APLWORKS.SYSTEM, /ACCOUNT.SYSTEM [see above], etc.). When you boot ProDOS, it runs the first system file listed in its directory. So, if BASIC.SYSTEM is the first system file on your ProDOS boot disk, ProDOS will boot and then put you in BASIC.

Additional Resources

The following books are available through most book stores:

Apple II Owner's Manual (Apple Computer, Inc.) Supplied with your Apple Computer. Take the time to read it.

Basic Programming with ProDOS (Addison-Wesley Publishing) Gives a detailed explanation of how to use ProDOS from AppleSoft Basic.

Beneath Apple ProDOS (Quality Software) Provides information about ProDOS for both the novice Apple user and the advanced programmer.

ProDOS Inside and Out (TAB Books) Very good book for both the beginning and advanced BASIC Programmer.

ProDOS User's Manual (Apple Computer, Inc.) Provides an overview of ProDOS and explains how to use the ProDOS User's Disk.

APPENDIX F

Getting Help

If you have a technical question relating to the Vulcan Hard Drive or any other Applied Engineering product that is not covered in the manual, please contact the dealer from whom you purchased the product. If you are experiencing difficulties with one particular program, contact the program's author or publisher.

In the event that the dealer or the publisher's support personnel cannot answer your question, call Applied Engineering Technical Support. The support representatives are experienced in the applications and uses of Applied Engineering products, but in order to provide a quick and effective answer to your question, they will need to know as much as possible about the hardware and software specifically related to your question. Please provide the technical support representative with the following information:

- ◊ The Applied Engineering product related to your question and its revision number.
- ◊ The original and current memory configuration of the card (if applicable).
- ◊ The model and revision of your computer.
- ◊ What peripherals are being used and what cards are in each slot.
- ◊ The name, version, and revision level of the software with which you are experiencing problems.
- ◊ The results of any test programs, diagnostics, or troubleshooting done by you, your dealer, or your software publisher's support department.

Applied Engineering
Technical Support
(214) 241-6069
9 AM to 12:30 PM & 1:35 PM to 5 PM(CST)
Monday Through Friday

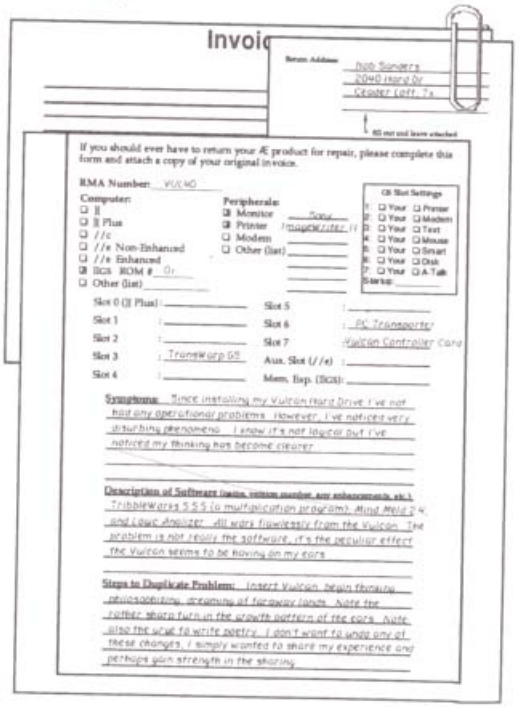
(Please call only the number above for technical support. Our sales office cannot transfer calls to the support lines.)

Returning a Product

RMA Number , "Attention" Sheet, and Invoice

If your product needs to be returned, the technical support representative will give you a Return Material Authorization (RMA) number.

- ❑ Record the RMA number for your own records.
- ❑ Write the RMA number on your package label.
- ❑ Fill out the Return Form on back of the yellow sheet marked "Attention!" A complete form will greatly reduce the time it takes to return your package.
- ❑ Attach a copy of your original invoice to the form.
- ❖ ***Warning***: If you don't include an invoice, products will be treated as out of warranty products and will be returned to you C.O.D. for the amount of the service charge.


Invoi

Return Address: Bob Sanders
2040 Island Dr
Greater Left, Tx

If you should ever have to return your Æ product for repair, please complete this form and attach a copy of your original invoice.

RMA Number: VULMO

Computer:
- ☐][
- ☐][Plus
- ☐ //c
- ☐ //e Non-Enhanced
- ☐ //e Enhanced
- ☒ IIGS ROM # 01
- ☐ Other (list)

Peripherals:
- ☒ Monitor Sony
- ☒ Printer Imagewriter II
- ☐ Modem
- ☐ Other (list)

GS Slot Settings

1:	☐ Your	☐ Printer
2:	☐ Your	☐ Modem
3:	☐ Your	☐ Text
4:	☐ Your	☐ Mouse
5:	☐ Your	☐ Smart
6:	☐ Your	☐ Disk
7:	☐ Your	☐ A-Talk

Startup:

Slot 0 (][Plus):
Slot 1:
Slot 2:
Slot 3: Transwarp GS
Slot 4:
Slot 5:
Slot 6: PC Transporter
Slot 7: Vulcan Controller Card
Aux. Slot (//e):
Mem. Exp. (IIGS):

Symptoms: Since installing my Vulcan Hard Drive I've not had any operational problems. However, I've noticed very disturbing phenomena. I know it's not logical but I've noticed my thinking has become clearer.

Description of Software (name, version number, any enhancements, etc.): Tribble works 5.55 (a multiplication program), Mind Meld 2.4, and Laser Analyzer. All work flawlessly from the Vulcan. The problem is not really the software, it's the peculiar effect the Vulcan seems to be having on my ears.

Steps to Duplicate Problem: Insert Vulcan, begin thinking, daydreaming, dreaming of faraway lands. Note the rather sharp turn in the growth pattern of the ears. Note also the urge to write poetry. I don't want to undo any of these changes, I simply wanted to share my experience and perhaps gain strength in the sharing.

When You Ship

If you don't have the original packing material, wrap the board in anti-static material (preferably the anti-static bag in which the card was originally shipped; however, aluminum foil will work fine). Pack it in a sturdy box cushioned with wadded papers (i.e. used computer paper or newspaper).

If you're shipping a Vulcan 20 or 40 Meg. Vulcan, remember to park the heads using the Park Heads program. The heads on the 100 Meg Vulcans park automatically.

- ❖ ***Warning***: If your product is damaged due to inadequate packing, your warranty will be void.

Include the return form and invoice.

Send the package, shipping prepaid, to:

RMA#__?__
Applied Engineering
Technical Support
3210 Belt Line Road, Suite 154
Dallas TX 75234

You should insure your package. Æ will not assume any responsibility for inadequate packing or loss or damage during shipping.

When We Receive

Our service department will use your completed form in an attempt to duplicate the problem.

If it is determined that your product is defective due to a manufacturing defect, your card will be repaired or replaced at Æ's option.

Any misuse, abuse, or non-Æ authorized alteration, modification, and/or repair to the Applied Engineering product will void the warranty. This warranty will also be void if you use the Æ product for any purpose other than its intended use.

Your product will be fully tested before it is shipped back to you, transportation prepaid, via UPS regular delivery.

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